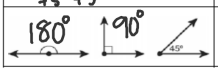
Name _____ Date Sept 25 Period _____

## Geometry Section 2-1 Notes

### *Using Inductive Reasoning to Make Conjectures*

When you make a general rule or conclusion based on a pattern, you are using **inductive reasoning.** A conclusion based on a pattern is called a **conjecture.**

| Pattern | Conjecture | Next Two Items |
|---|---|---|
| +5 +5 +5<br>–8, –3, 2, 7, . . . | Each term is 5 more than the previous term. | 7 + 5 = 12<br>12 + 5 = 17 |
|  | The measure of each angle is half the measure of the previous angle. |  |

**Find the next item in each pattern.**

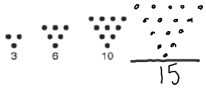
1. $\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, 1,$ 1 1/4

+1/4

2. 100, 81, 64, 49, 36

-19 -17 -15 -13

$10^2$ $9^2$ $8^2$ $7^2$ $6^2$

3. 

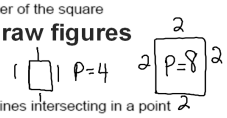

4. 

1-7

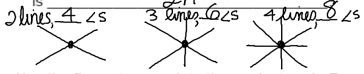
**Complete each conjecture.**

5. If the side length of a square is doubled, the perimeter of the square is _____doubled_____.

draw figures




6. The number of nonoverlapping angles formed by $n$ lines intersecting in a point is _____.

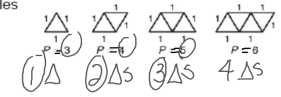



draw figures

n lines, 2n ∠s

**Use the figure to complete the conjecture in Exercise 7.**

7. The perimeter of a figure that has $n$ of these triangles is _____n + 2_____.




1 Δ 2 Δs 3 Δs 4 Δs

Since a conjecture is an educated guess, it may be true or false. It takes only one example, or **counterexample,** to prove that a conjecture is false.

Conjecture: For any integer $n$, $n \leq 4n$.

| $n$ | $n \leq 4n$ | True or False? |
|---|---|---|
| 3 | $3 \leq 4(3)$<br>$3 \leq 12$ | true |
| 0 | $0 \leq 4(0)$<br>$0 \leq 0$ | true |
| –2 | $-2 \leq 4(-2)$<br>$-2 \leq -8$ | false |

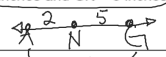
$n = -2$ is a counterexample, so the conjecture is false.

**Show that each conjecture is false by finding a counterexample.**

8. If three lines lie in the same plane, then they intersect in at least one point.

draw

9. Points *A*, *G*, and *N* are collinear. If *AG* = 7 inches and *GN* = 5 inches, then *AN* = 12 inches. this part is false




draw

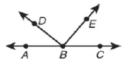
10. For any real numbers *x* and *y*, if $x > y$, then $x^2 > y^2$. Try #s.

1 > -2 False

$1^2 > (-2)^2$ $1 > 4$

$0^2 > (-7)^2$ $0 > 49$

11. The total number of angles in the figure is 3.




12. If two angles are acute, then the sum of their measures equals the measure of an obtuse angle.

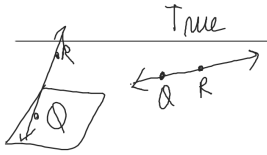
$45° + 45° = 90°$, not obtuse

$15° + 12° = 27°$, not obtuse

**Determine whether each conjecture is true. If not, write or draw a counterexample.**

13. Points *Q* and *R* are collinear.

True




14. If *J* is between *H* and *K*, then *HJ* = *JK*.

False